

HP Performance Optimized Datacenter (POD) 240a Site Requirements Guide



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Contents

Overview	5
About this document	5
Site assessment	5
Site requirements	6
HP Site Preparation Drawing Package	6
Site preparation	6
Early infrastructure requirements	6
Site pad	7
Other structures	7
Space requirements and clearances	8
HP POD 240a dimensions and required clearances	8
HP POD 240a weight	10
HP POD 240a and support equipment sample offload plan	10
Site space and clearance requirements	11
Additional equipment space requirements	11
Future expansions	11
Preparing for delivery and assembly	12
Shipping considerations	12
Suggested assembly installation equipment	12
Safety for assembly	12
Temporary lighting and power	13
Storage requirements	13
Assembly prerequisites	13
Environmental considerations	14
Environmental considerations	14
Cold weather	14
Areas prone to lightning or power surges	14
Seismic activity	14
Utilities	15
Proximity to utilities and drains	15
System utilities	15
Water supply	15
Drainage	16
Power	17
Required facility connections	19
Connections to central facility infrastructure	19
Network connections	19
Connection portals	19
Grounding requirements	20
Supported facility connections	23
Humidifier	23
HP POD 240a security	24

Fire, safety, and security notifications.....	24
Glossary	25

Overview

About this document

This document outlines the site requirements for an HP Performance Optimized Datacenter (POD) 240a. The customer must provide a qualified architectural or consulting engineering team to generate site-specific documents for each HP POD 240a installation, including final site drawings. The customer's site installation design must comply with all local and national regulations, ordinances, codes, and the specifications listed in this document.

Site assessment

HP requires a detailed site assessment prior to planning and preparing the customer site location for the HP POD 240a. Consult with HP to schedule a site assessment.

For more information, see the Site Assessment Checklist in the *HP Performance Optimized Datacenter (POD) 240a Site Preparation Guide*.

Site requirements

HP Site Preparation Drawing Package

HP provides detailed schematic engineer drawings of the HP POD 240a in the *HP Site Preparation Drawing Package*, included on the documentation CD.

Site preparation

NOTE: The weight provided is an estimate. The total weight of the HP POD 240a will differ based on the IT equipment installed.

The structural design of the HP POD 240a site pad design is based on specific weight load locations, accounting for the HP POD 240a structural footing and supported IT infrastructure.

The HP POD 240a must be installed on a surface capable of supporting the following weights:

- HP POD 240a with 24 HVAC/DX units—117,526 kg (259,100 lb)
- HP POD 240a with 24 HVAC/DX units and IT equipment installed—Approximately 183,750 kg (405,100 lb)

The site pad must be level with less than +/-0.5 degrees differential from extreme to extreme. Shimming is allowed when shims are used directly under the HP POD 240a load pads, and are placed in increments across the length of the HP POD 240a, ensuring the HP POD 240a is level.

The customer is responsible for adequately protecting the surrounding environment during excavation.



IMPORTANT: The HP POD 240a is designed for ground level installation. If you install the HP POD 240a on an elevated surface, make sure the minimum height requirements for circuit breaker actuators are considered per local and national electric code requirements. The area in front of the outside panels must include a work platform.

For HP POD 240a load specifications and load distribution, see the *HP Site Preparation Drawing Package* (on page 6):

- External top view—Load distribution within IT sections
- External bottom view—Load bearing footprint
- External bottom view—Load bearing footprint, weights
- External bottom view—Load distribution pads (site dependant)

Early infrastructure requirements

The following work is expected to be complete on-site prior to the HP POD 240a assembly:

- Customer power equipment and feeders
- Underground construction requirements

- Operational clearance around the HP POD 240a
- Power (on page [17](#))
- Water supply (on page [15](#))
- Drainage (on page [16](#))
- Site pad (on page [7](#))
- Other structures (on page [7](#))

Site pad

The structural design of the HP POD 240a site pad design is based on specific weight load locations, accounting for the HP POD 240a structural footing and supported IT infrastructure.

Other structures

If a customer-provided vestibule or other structure will be installed at the HP POD 240a site, the following specifications must be maintained:

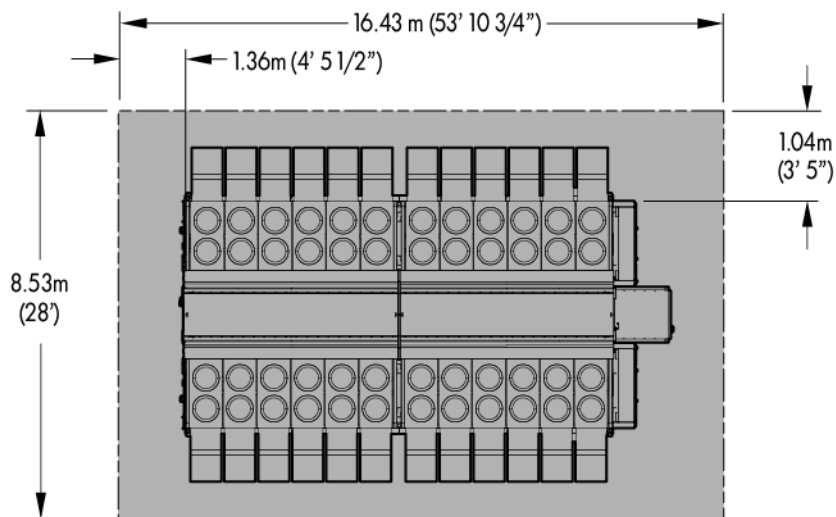
- Flashing must be installed to the exterior of the HP POD 240a in the location where the other structure will be attached to protect the HP POD 240a and ensure a waterproof barrier.
- Access catwalks and/or landings might be required to maintain the required egress from the HP POD 240a HVAC/DX service area.
- Access catwalks and/or landings might be required to maintain the required access to the HP POD 240a electrical panels.

Space requirements and clearances

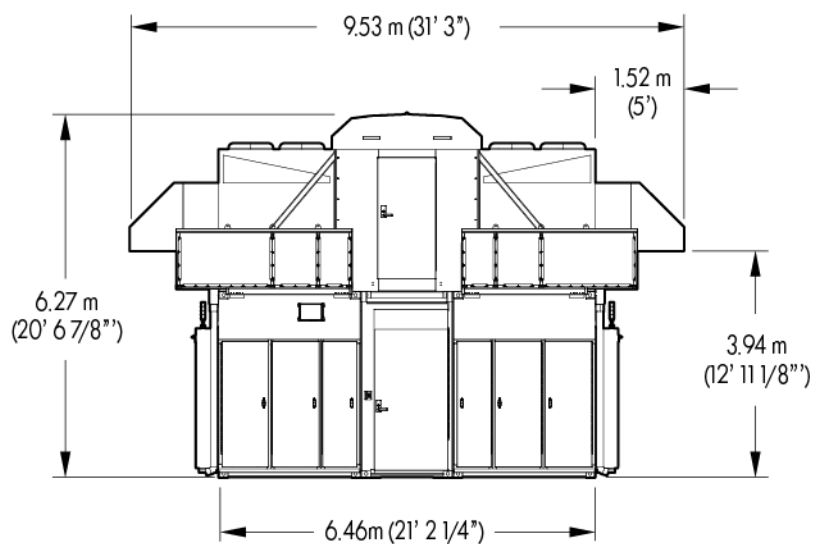
HP POD 240a dimensions and required clearances

NOTE: Shaded areas indicate required clearances.

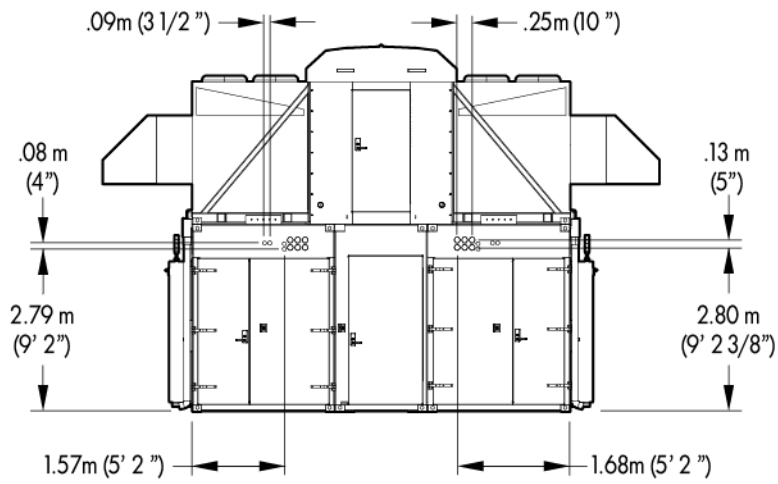
Top view clearances shown



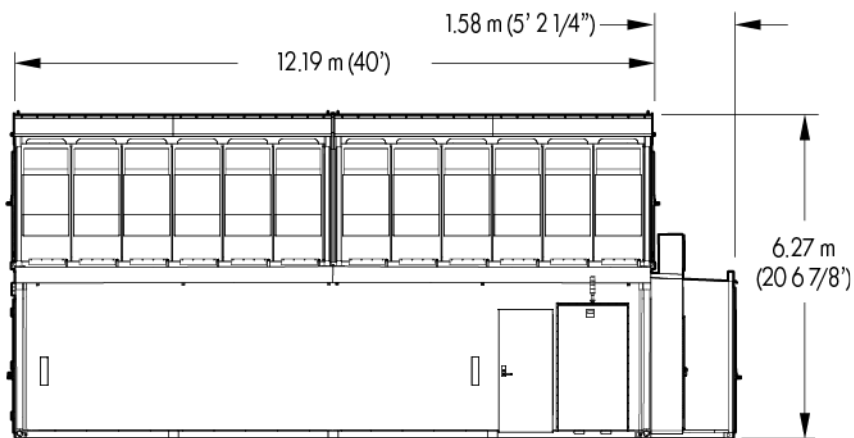
End 1 view clearances shown



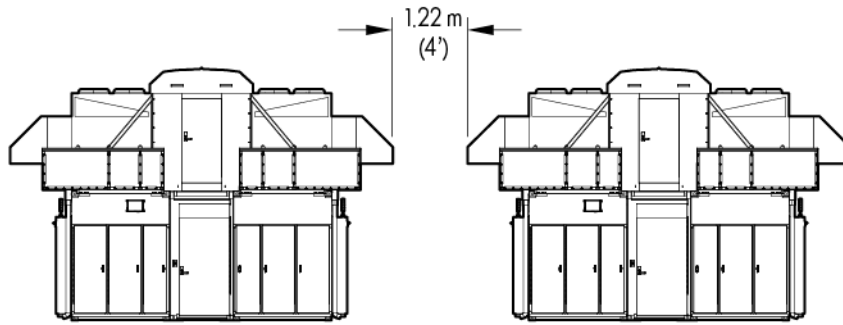
End 2 view clearances shown



Side view clearances shown



End 1 view clearances shown



HP POD 240a weight

For information on the trucks, deliverables, and the approximate weight of the contents, see the HP POD 240a and support equipment sample offload plan (on page 10). The exact number of required trucks and the components included on each truck might be different depending on the power redundancy in configuration.

NOTE: Allow additional space required to accommodate any additional equipment that is to be installed, such as a generator or UPS.

HP POD 240a and support equipment sample offload plan

This is a sample of trucks and weights for the HP POD 240a structure and equipment that is delivered to the customer site. Each offload plan will vary based on the components purchased, the configuration of the HP POD 240a (redundant and non-redundant). The exact number of required trucks and components included on each truck may differ based on the specific customer POD solution.

Truck*	Contents	Comments	Truck weight (lbs)
1	Generator enclosure P1	Optional	57,935
2	Fuel tank for Generator-P1	—	29,455
3	Generator enclosure P2	Optional	57,935
4	Fuel tank for Generator-P2	—	29,455
5	UPS enclosure A1	Optional	62,895
6a	IT section A without IT installed	Includes racks, PDUs, and dropboxes, but has no IT installed.	50,000
6b	IT section A with IT installed	—	93,000
7	Hot aisle	Includes fans and catwalk	23,000
8a	IT section B without IT installed	Includes racks, PDUs, and dropboxes, but has no IT installed.	50,000
8b	IT section B with IT installed	—	93,000
9	UPS enclosure B1	Optional	62,895
10	HVAC/DX cradles 1 and 2	Each with 12 HVAC/DX and a catwalk	18,000 per cradle

Truck*	Contents	Comments	Truck weight (lbs)
11	HVAC/DX cradles 3 and 4	Each with 12 HVAC/DX and a catwalk	18,000 per cradle
12	Canopy and end walls	Creates the service area	8,100
13	HP POD 240a electrical pull boxes	For electrical service entry	875
14	Misc. parts and pieces	Gutter assembly, condensation, piping, and hardware	1,000

*The truck number does not reflect the actual order of the trucks arrival.

Site space and clearance requirements

The selected site for the HP POD 240a must be large enough to install, service, maintain, and potentially upgrade the unit and its payload.

Here are two examples for site clearances:

- If the HP POD 240a is to be installed in a warehouse, ensure that the warehouse doors are large enough to accommodate it.
- If the HP POD 240a is to be installed outdoors, ensure there is adequate clearance for all buildings, utility lines, or other site structures, such as gates and headers.

Every site must have sufficient clearance for assembly, maintenance, and service, such as handling devices such as a forklift, scissor lift, boom lift, or crane.

Adequate space around the HP POD 240a is necessary for airflow and cooling purposes. For specific space requirements, see HP POD 240a dimensions and required clearances (on page 8).

Additional equipment space requirements

Allow additional space required to accommodate any additional equipment that is to be installed, such as a generator or UPS.

Future expansions

When selecting a site location, consider future space and accessibility requirements. Adequate space around the HP POD 240a is necessary for airflow and cooling purposes. When locating additional equipment in close proximity of the HP POD 240a, for example, additional HVAC/DX, generators, and UPS devices, consult with HP for site locations.

For specific space requirements, see the HP POD 240a dimensions and required clearances (on page 8).

Preparing for delivery and assembly

Shipping considerations

- The HP POD 240a is packaged for shipping such that exposure to weather does not result in damage to the components.
- The HP POD 240a is shipped on air-ride trailers to avoid vibrations during shipment.
- The HP POD 240a components are shipped based on the assembly plan and available space at the customer site.
- Depending on the site location, additional restrictions and permits might be required, which can effect the delivery time line.

Suggested assembly installation equipment

- Crane (2)
- Forklift (1)
- Scissor lift (2)
- Boom lift (1)
- Temporary flood light towers (2)
- Fuel spill containment kit
- Portable generator

Safety for assembly

National, state, regional, and local safety regulations must be enforced at all times to prevent work-related injuries. Before installation, HP recommends reviewing the following OSHA safety sections:

- Equipment safety—Crane, forklift, scissor-lift, boom-lift, and tools
- Traffic safety
- Assembly and personnel safety
- Electrical safety
- Fuel spill containment safety

PPE and head protection

All contractors must adhere to OSHA requirements for the use of PPE to reduce employee exposure to hazards. The construction area around the HP POD 240a construction site is a required hard-hat area, and all personnel who enters the construction site must wear a hard hat, safety vest, and any additional OSHA, HP, and customer required PPE.

Temporary lighting and power

Proper temporary lighting and power must be installed and maintained in all construction work areas.

When using temporary lighting:

- Label panels and breakers that are used for temporary lighting and power.
- The location of panels must be shown on the construction site plan and posted at the entrance to work area.
- Lamps for general illumination must be protected from breakage, and metal shell sockets must be grounded.
- Temporary lights must not be suspended by cords, unless they are so designed.

Storage requirements



CAUTION: The HP POD 240a must maintain 20% relative humidity to minimize condensation and oxidation within the HP POD 240a.

Changes in ambient temperatures cause condensation in a HP POD 240a that is not operating. If the HP POD 240a is placed in storage or is non-operating mode for over 72 hours, HP recommends using one of the following methods to minimize condensation and oxidation within the HP POD 240a:

- Dessicant unit
- Dessicant material
- Heater with a fan
- Air conditioner with heater strip

Consult with HP Services to determine the most effective method.

Assembly prerequisites

Before installing the HP POD 240a, verify that the following prerequisites have been met:

- All components have been delivered to the facility.
- The HP POD 240a and power distribution components are in final location.
- Facility power, water, and drainage are at the final location.
- Provisions for properly grounding the HP POD 240a have been made.
- There are required clearances, including overhead
- Coordination of all trade personnel required for assembly
- Completed Job Safety Analysis
- Required PPE and head protection (on page 12) for all personnel is available

Environmental considerations

Environmental considerations

- Avoid placing the HP POD 240a directly along a drainage path or in an area prone to flooding.
- Verify that the HP POD 240a is properly grounded in accordance with NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).

Cold weather

The HP POD 240a requires a water supply and several water drains. Extreme cold weather might cause damage to the supply and drain lines. Evaluate the following for additional cold weather protection:

- Regional location of HP POD 240a
- Exposure of supply and drain lines to extreme cold temperature

Extreme cold weather can affect crane and lifting operations. When temperatures drop below 10°F, appropriate consideration must be made with respect to shock loading, crane hydraulics, and possible derating of the crane.

Areas prone to lightning or power surges

The HP POD 240a structure and internal components are all bonded together. A common Grounding Electrode Conductor Connection point is provided. Properly bonding and grounding of the HP POD 240a minimizes the effects of a lightning strike. A TVSS device is provided on the HP POD 240a input connection to protect the HP POD 240a electrical system from voltage transients. If your site is in an area that is subject to frequent lightning strikes, the HP POD 240a must be protected in accordance with NFPA 780/NEC (NA) and IEC (EMEA and APJ). HP recommends that you contact a certified lightning protection consultant.

Seismic activity

If your site is in an area that has frequent seismic activity, HP recommends that you contact a seismic activity consultant. If your site is in an area that has high vibration level, HP recommends that you contact a vibration isolation consultant. There are no provisions for anchoring the HP POD 240a.

Utilities

Proximity to utilities and drains

Consider proximity to required utilities, such as power, water, and network connections. While required utilities can be brought to nearly any selected site, there is a potential for increased costs and decreased efficiency when the HP POD 240a is located further from the utility source.

For utility clearance information, see HP POD 240a dimensions and required clearances (on page 8).

System utilities

The site location must accommodate the following utilities:

- Water supply (on page 15)
- Drainage (on page 16)
- Power (on page 17)

Water supply

The HP POD 240a requires supply water for the humidifier. The supply water must meet the following requirements:

Requirement	Specification
Pressure	between 0.1 and 0.8 MPa (1 and 8 bars)
Temperature	between 1 and 40 °C
Instant flow-rate	no lower than the rated flow of the fill solenoid valve
Connection	G3/4M
Hardness	no greater than 40°FH (equal to 400 ppm of CaCO ₃)
Conductivity	125 to 1250 µS/cm
Organic compounds	None

- Do not treat the water with softeners, because softeners might produce foam, which affects the operation of the unit.
- Do not use well water, industrial water, water from cooling circuits, or water contaminated by any chemicals or bacteria.
- Do not add disinfectants or anti-corrosive compounds to the water, which are potential irritants.

For additional dimensions, see the *HP Site Preparation Drawing Package* (on page 6).

Water quality

Water must be maintained per the following acceptable water quality standards.

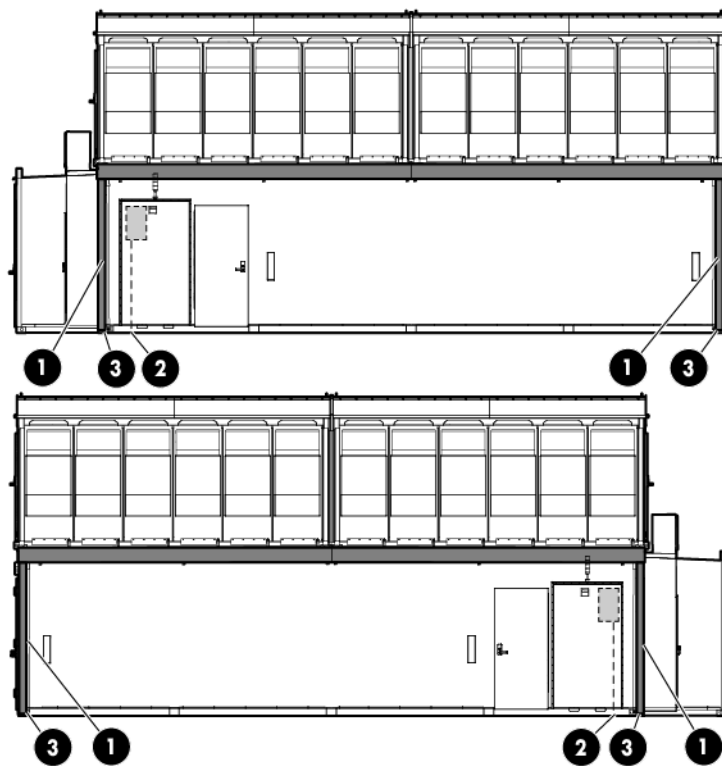
Requirement	Specification
Type of water introduced	Drinking water Do not use demin or softened water.
Instant water fill flow-rate	0.6 l/min 0.16 gpm

If your water is out of range, consult a water quality expert.

Drainage

The following figure illustrates the drain locations on the HP POD 240a.

Side view shown



Callout	Component	Description	Quantity per side	Total quantity per HP POD 240a
1	Condensate drain	Removes condensation and water from the HP POD 240a exterior.	2	4
2	Humidifier drain	Removes excess water pulled from the interior of the HP POD 240a by the humidifier.	1	2
3	Rain water drain	Removes rain water from the HP POD 240a	2	4

Power



IMPORTANT: To provide power to the HP POD 240a, external transformers and switchboards may be required. This equipment must be designed and installed to adhere with local, state, and national codes, and installed by contractors with licensing required by the local jurisdiction; city, township, and state.

For all site preparation drawings, see the *HP Site Preparation Drawing Package* (on page 6) included on the documentation CD.

Power requirements

The HP POD 240a can be installed as a single source 1N load by providing all required feeders from one common power sources and from common switchboards and transformers, if required. A fully redundant 2N installation can be achieved by feeding the parallel power paths from independent power sources, switchboards and transformers if required.



IMPORTANT: All 3-phase WYE feeders for the HP POD 240a require that the neutrals and the equipment grounding conductors remain isolated. Bonding of the two conductors is allowed at the power source only.

Power feeder requirements:

Feature	Specification
Enclosure rating	NEMA 3R
Mechanical power for cooling system components	4 x 300A feeders at 480VΔ, 3-phase, 3-wire, with equipment ground conductor 2 x 3" conduit fittings per feeder provided
Critical power for IT equipment	4 x 1000A feeders at 415Y/240V, 3-phase, 4-wire, with equipment ground conductors 4 x 4" conduit fittings per feeder provided
Total critical power required for HP POD 240a full capacity	<ul style="list-style-type: none">• 2N Redundant—1.2 MVA• Non-redundant—2.4 MVA

External power source

When determining the final location of the power connections, consider the following:

- Distance between the facility utilities and the location of the transformer and switchboard
- Distance between the transformer and switchboard and the HP POD 240a
- Distance between the UPS/Generator locations and the HP POD 240a switchboard
- Requirements for routing electrical feeders (underground or overhead)

The facility power connection must be installed in compliance with local electrical codes and regulations. HP reference electrical installation design is based on a maximum distance of 15.2 m (50 ft) or line of sight between the switchboard and the HP POD 240a.

Transformers and switchboards

The input power for the Critical IT Loads requires a source of 380-415V, 3phase Wye power. This may require custom transformer(s) be provided to derive this power if it does not already exist at the source. In addition to the overall loading and KVA size, considerations should be given to the Harmonic Content of the installation when specifying the K-Factor of the transformer(s). Alternatively, Harmonic Mitigating Transformers might be used to passively cancel the harmonics generated by the IT Equipment.

HP offers several powerhouse solutions that include automatic transfer switching, UPS backup, transformers and output distribution switchboards to supply your power needs.

On-site connections may include:

- Main facility power to the primary side of the transformer
- Transformer to the switchboard
- Switchboard assembly to the HP POD 240a

For connection information, see the *HP Site Preparation Drawing Package* (on page 6).

Preparing the site for power

- The customer must provide and submit the following fully coordinated drawings showing the exact routing, plan view, sections, and elevations, for approval before beginning site preparation:
 - Coordinated underground conduit routing drawings
 - Site pad drawings
- The HP POD 240a requires an external transformer and switchboard. If the customer provides their own transformer and switchboard, they must also provide HP with the engineering drawings.



IMPORTANT: To provide power to the HP POD 240a, external transformers and switchboards may be required. This equipment must be designed and installed to adhere with local, state, and national codes, and installed by contractors with licensing required by the local jurisdiction; city, township, and state.

Required facility connections

Connections to central facility infrastructure

The HP POD 240a is designed to function standalone but may be connected to existing facility systems with additional engineering and costs.

- HP POD 240a Environmental Control System
 - Operational status
 - Power consumption
 - Environmental status
- Life safety systems
 - EPO
 - Fire detection
 - Fire suppression
- Site communication
 - Phone
 - Security
- Networking
 - IT connections

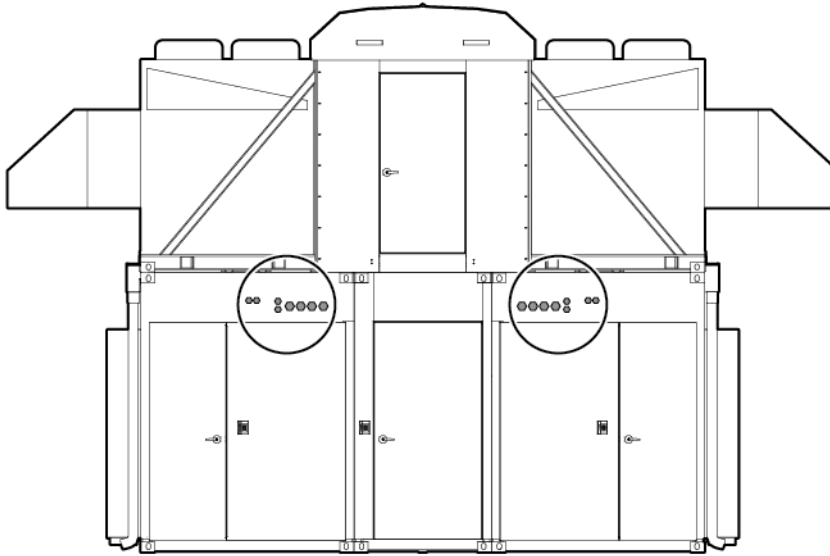
Network connections

For information on the network connections, see the *HP POD 240a Networking Guide*.

Connection portals

The networking and connection portals are located on the cargo-end of the HP POD 240a. There are eight portals per IT section, and each of the different sized portals are used for different connections.

End view shown



Connection portal diameter	Connection point	Quantity per IT section	Total quantity per HP POD 240a
3-inch portal	Networking connection for all IT	4	8
1.5-inch portal	Communication connection for all communication <ul style="list-style-type: none">• ECS• EPO• Fire alarm• Phone	2	4
1.5-inch portal	(Optional) vestibule communication connections	2	4

NOTE: The connection portal location and configuration might look different, depending on the HP POD 240a model.

Grounding requirements

The HP POD 240a structure and internal components are all bonded together. A common Grounding Electrode Conductor Connection point is provided.



WARNING: To avoid the risk of personal injury or electric shock, the HP POD 240a must be properly grounded, and each of the individual sections must be bonded together in accordance with NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).



CAUTION: You must remove any painted surface from all grounding surfaces. Failure to do so results in an ineffective ground.

- Grounding and bonding of the HP POD 240a must comply with Article 250 of the NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).

- The HP POD 240a structural sections, metal raceways, wireways, conduit, boxes, and other external intersystem components must be bonded with grounding conductors per NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).
- Bonding of Piping Systems and Exposed Structural Steel must comply with NFPA 70 in accordance with NEC (NA) and IEC (EMEA and APJ).

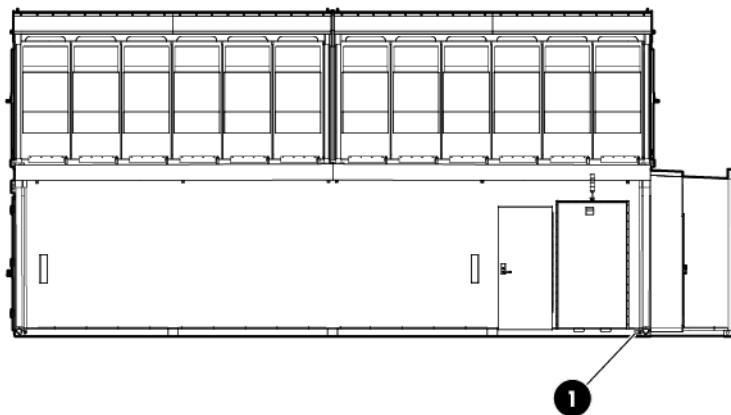
Feature	Specification
Grounding pad	<ul style="list-style-type: none"> • A grounding pad is located on the underside of the HP POD 240a at the outside corner of each IT section, under the electrical panel. • Grounding pads are located inside the HP POD 240a at ceiling level to bond the sections together and bond the IT racks.
Grounding lugs	<ul style="list-style-type: none"> • Grounding lugs cannot be attached to any painted surface. • Grounding lugs must be compression-type 2-hole lug
Ground rod system or ground well	Customer must provide an effective grounding system with ground rod or ground well.



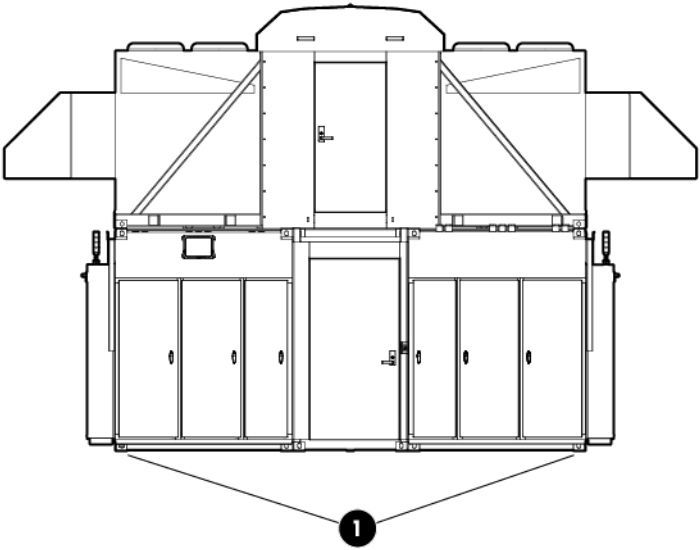
IMPORTANT: Before installing the HP POD 240a, consult your local AHJ for applicable codes and to review site-specific location guidelines. If needed, obtain any necessary permits.

The grounding electrode conductor connections are located on IT sections A and B of the HP POD 240a. The following figure shows the location for one of the IT sections.

Side view shown



End view shown



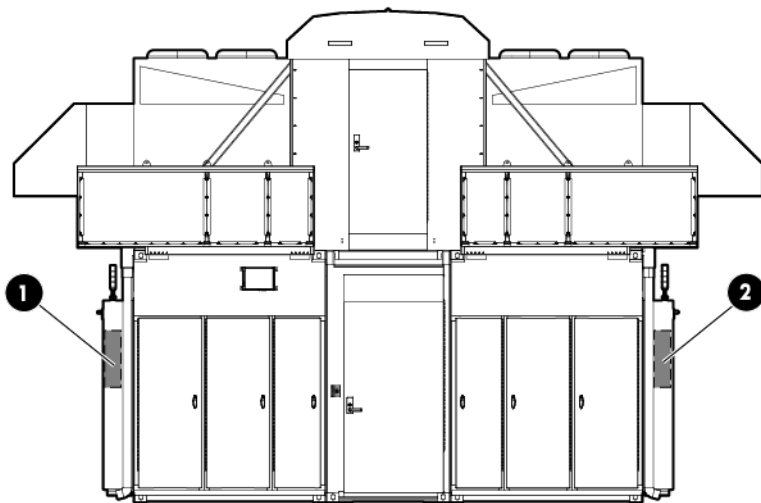
Item	Component
1	Grounding electrode conductor connection

Supported facility connections

Humidifier

A dedicated water supply and approved drainage is required for the humidifier. For more information about the humidifier, see the *HP Performance Optimized Datacenter (POD) 240a Operation and Maintenance Manual* provided with the HP POD 240a.

End view shown



Item	Component
1	Humidifier drain and water supply on IT section A
2	Humidifier drain and water supply on IT section B

NOTE: Confirm with AHJ that condensate water and rain water can be mixed in the same drainage.

HP POD 240a security

The HP POD 240a is equipped with standard key lock hardware at each personnel entry door and six external electrical cabinets. Each personnel entry door includes a door access contact that can be connected to the customer facility security system. Conduit and junction boxes are provided for customer installed controlled access systems.

Additional options for controlled access security includes:

- Electronic card reader
- 12-digit security code keypad
- Magnetic lock on each entry door

Fire, safety, and security notifications

Dry contacts are provided to enable the connection between the HP POD 240a fire alarm system and the customer facility fire system. If the HP POD 240a is connected to the customer facility systems, then the HP POD 240a-initiated alarms, notify the facility systems.

The customer must provide an independent connection for each system listed in the following table.

Alarm	Meaning
Fire prevention alarm	Smoke has been detected in the HP POD 240a.
Fire suppression system (optional)	The suppression system alarm has been activated, and gas will be dispersed to suppress a fire.
Security	A security breach has occurred.
EPO	The EPO system has been activated by an EPO button or thermal event, and shut down the HP POD 240a.

The electrical layout of the fire alarm system is as described in the schematic drawing that is supplied with the *HP Performance Optimized Datacenter (POD) 240a Operations and Maintenance Manual*.

Glossary

AHJ

Authority Having Jurisdiction

door

A hinged portion of an enclosure that covers an opening.

DX

direct expansion

ECS

environmental control system

EPO

emergency power off

equipment

A general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, a modular data center. (Source: NEC.)

HVAC

Heating, Ventilation, and Air Conditioning

IEC

International Electrotechnical Commission

ISO

International Organization for Standardization

labeled

Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner. (Source: NEC.)

listed

Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards potential of not more than 42.4 V (DC or peak) supplied by a primary battery or by an isolated secondary circuit, and where the current capacity is limited by an overcurrent device, such as a fuse, or by the inherent capacity of the secondary transformer or power supply, or a combination of a secondary winding and an impedance. A circuit derived from a line-voltage circuit by connecting a resistance in series with the supply circuit to limit the voltage and current is not identified as a low-voltage limited energy circuit. or has been tested and found suitable for a specified purpose. (Source: NEC.)

The means for identifying listed equipment might vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

NA

North American

NEC

National Electrical Code

NFPA

National Fire Protection Association

overcurrent protection

A device designed to open a circuit when the current through it exceeds a predetermined value. The ampere rating of the device is selected for a circuit to terminate a condition where the current exceeds the rating of conductors and equipment due to overloads, short circuits and faults to ground.

PPE

personal protective equipment

structure

Enclosure of sufficient size to allow entry of personnel.

UL

Underwriters Laboratory

UPS

uninterruptible power system

VESDA

Very Early Smoke Detection Apparatus